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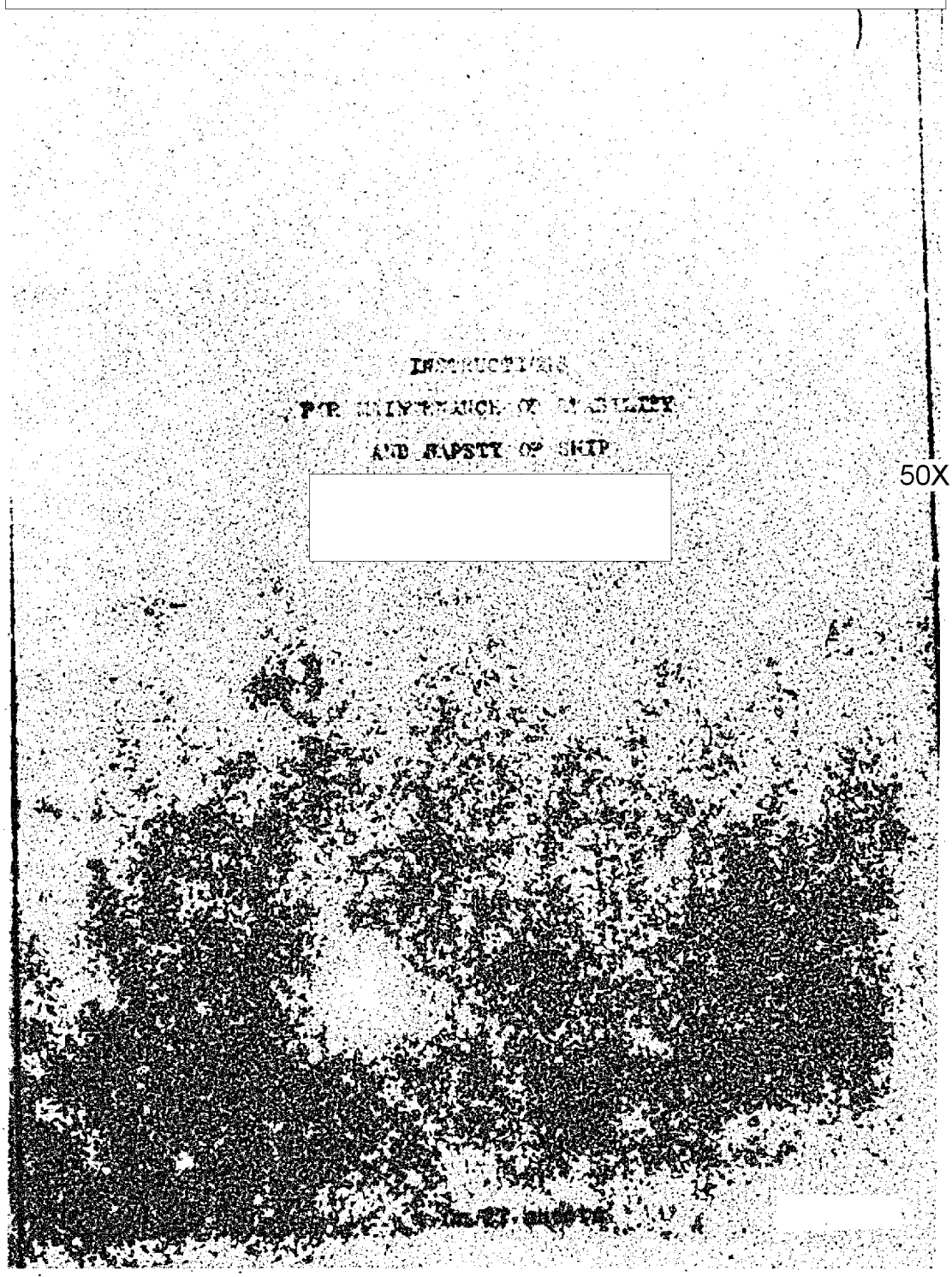

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## I. INTRODUCTION

The present instructions are based upon the average values of displacement and co-ordinates of the centre of gravity:

Standard displacement $D_{st.}$=1,[illegible] t; Zg=3.72 m; Xg=-1.99 m

Normal displacement $D_n$=1,070 t; Zg=3.53 m; Xg=-1.37 m

Full-load displacement $D_f$=1,140 t; Zg=3.41 m; Xg=-2.46 m

The initial metacentric heights measure:

$h_{st.}$=0.7[illegible] m; $h_n$=0.75 m; $h_f$=0.75 m

The present instructions are equally applicable to all the ships of project [illegible] provided that the difference between the actual value of the coefficients of stability at standard and normal displacements and the data given below is within minus 5 to plus 10%:

$D_{st.} h_{st.}$=1,000x0.7[illegible]=700 t.m.;

$D_n h_n$=1,070x0.7[illegible]=[illegible] t.m.

If large alterations of stability coefficients are involved due to an overhaul or modification of the ship, the data given below in the form of a tabulated statement should be revised.

The intact and damage stability characteristics presented in the accompanying tables hold for a ship proceeding in water at 1,000 tons per cu.m. density.

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The statical stability diagrams are plotted in the form of conventional righting levers (moments of statical stability with reference to the ship's normal displacement, the statutory loads included).

The values of the transverse and longitudinal metacentric heights given in a tabular form for cases of dangerous flooding hold for a ship with no list; and the values of moments to change heel one degree and to change trim one centimeter, for a damaged ship in stable equilibrium.

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## II. STABILITY AND POOP OF SURVIVAL CONDITION

### INFORMATION

1. Basic characteristics of initial stability of ship in various loading conditions, with statutory items shown:

Table 1

| Name | Symbol | Unit | Displacement: Light load | Full load | Ballast load |
|---|---|---|---|---|---|
| Displacement | D | t | 10000 | 16000 | 11400 |
| Mean draught | T | m | 2.00 | 3.00 | 2.40 |
| Centre of gravity above base line | ZG | m | 1.50 | 2.50 | 1.61 |
| Centre of buoyancy above base line | ZB | m | 1.00 | 1.50 | 1.07 |
| Transverse metacentric radius | r | m | 2.00 | 1.73 | 1.94 |
| Metacentre above base line | ZM | m | 3.50 | 4.23 | 3.67 |
| Transverse metacentric height, free surface effects excluded | h | m | 2.00 | 2.73 | 2.06 |
| Free surface correction | | | | 1.23 | |
| Corrected metacentric height | | | | 1.50 | |
| Trim per cm immersion | | | | 0.16 | |
| Moment to change trim 1 cm | | | | 144 | |
| Coefficient of stability | | | | | |

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2. Basic characteristics of stability of ship in various loading conditions, given above.

| Name | Symbol | Unit | Conditions | | |
|---|---|---|---|---|---|
| | | | [illegible] | [illegible] | full-load |
| Displacement | D | t | [illegible] | [illegible] | 11[illegible] |
| Mean draught | T | m | [illegible] | [illegible] | [illegible] |
| Centre of gravity above base line | [illegible] | m | [illegible] | [illegible] | [illegible] |
| Centre of buoyancy above base line | [illegible] | m | [illegible] | [illegible] | [illegible] |
| Transverse metacentric radius | [illegible] | m | [illegible] | [illegible] | [illegible] |
| Metacentre above base line | [illegible] | m | [illegible] | [illegible] | [illegible] |
| Transverse metacentric height, free surface effects excluded | [illegible] | m | [illegible] | [illegible] | 0.82 |
| Free surface deduction | [illegible] | m | [illegible] | [illegible] | 0.13 |
| Corrected metacentric height | h | m | [illegible] | [illegible] | 0.69 |
| Tons per cm immersion | q | t/cm | [illegible] | [illegible] | [illegible] |
| Moment to change heel 1 deg. | M | $\frac{t \cdot m}{deg}$ | [illegible] | [illegible] | [illegible] |
| Coefficient of stability | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

Notes (secured for sea), 20 % total weight, are arranged on upper deck in the after part of the ship.

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3. Basic characteristics of initial stability of ship in various loading conditions, with landing party aboard

Table 3

| Name | Symbol | Unit | Displacement | | |
|---|---|---|---|---|---|
| | | | Stan-dard | Nor-mal | Full-load |
| Displacement | D | t | 1014 | 1084 | 1154 |
| Mean draught | T | m | 2.71 | 2.83 | 2.96 |
| Centre of gravity above base line | Zg | m | 3.75 | 3.56 | 3.44 |
| Centre of buoyancy above base line | Zc | m | 1.56 | 1.65 | 1.72 |
| Transverse metacentric radius | $\rho$ | m | 2.84 | 2.69 | 2.56 |
| Metacentre above base line | Zm | m | 4.40 | 4.34 | 4.29 |
| Transverse metacentric height, free surface effects excluded | $h^1$ | m | 0.65 | 0.79 | 0.84 |
| Free surface deduction | $\Delta h$ | m | 0.01 | 0.07 | 0.13 |
| Corrected metacentric height | h | m | 0.64 | 0.72 | 0.71 |
| Tons per cm immersion | q | t/cm | 5.41 | 5.45 | 5.50 |
| Moment to change heel 1 deg. | | $\frac{t \cdot m}{deg}$ | 11.1 | 13.4 | 14.3 |
| Coefficient of stability | | t.m | 710 | 770 | 819 |

Landing party, 100 men strong, is accommodated in crew spaces (45 men - in crew space No.1, 20 men - in crew space No.2, 35 men - in crew space No.3).

Landing party equipment, 3 tons, is to be arranged on upper deck at funnel.

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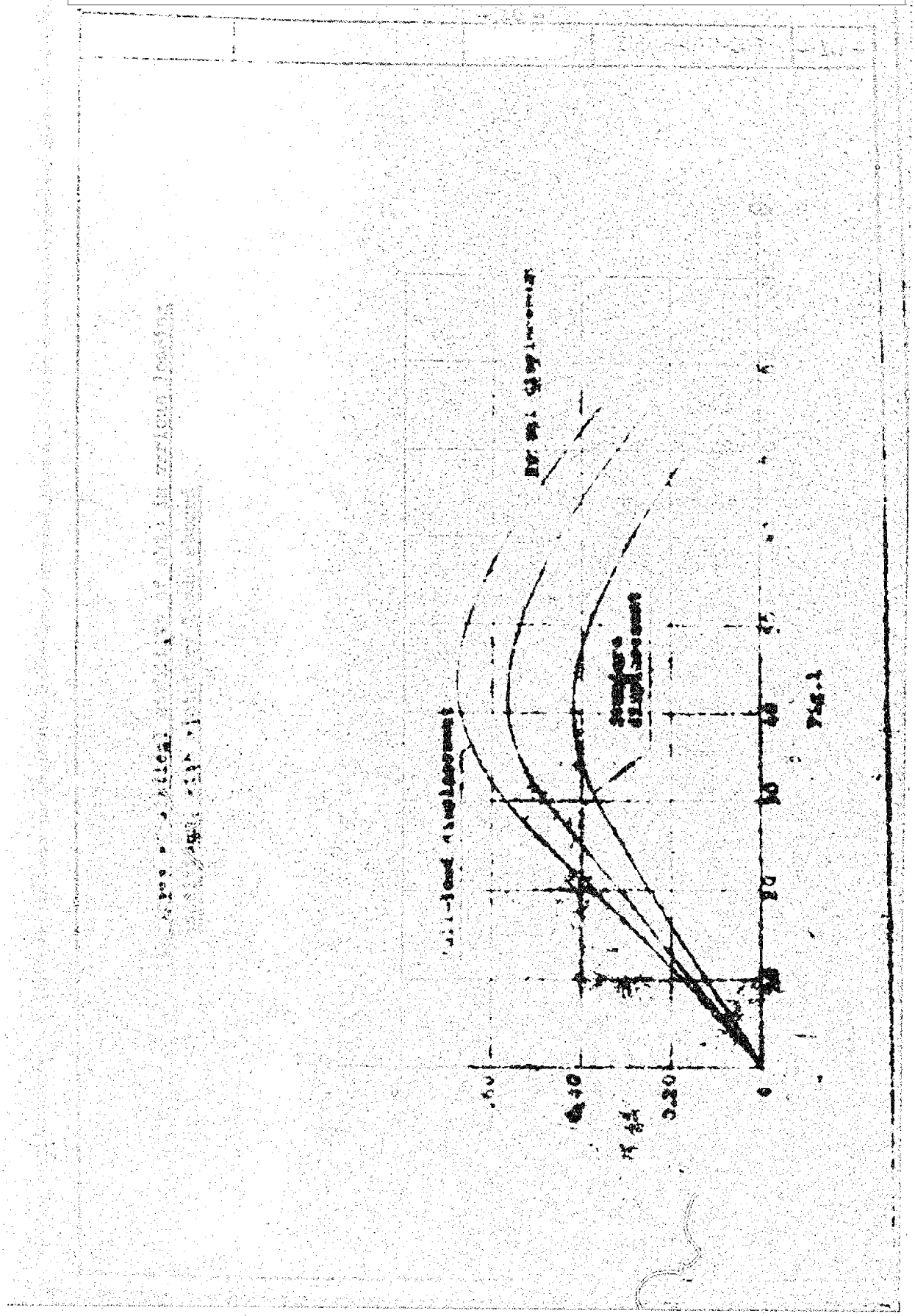

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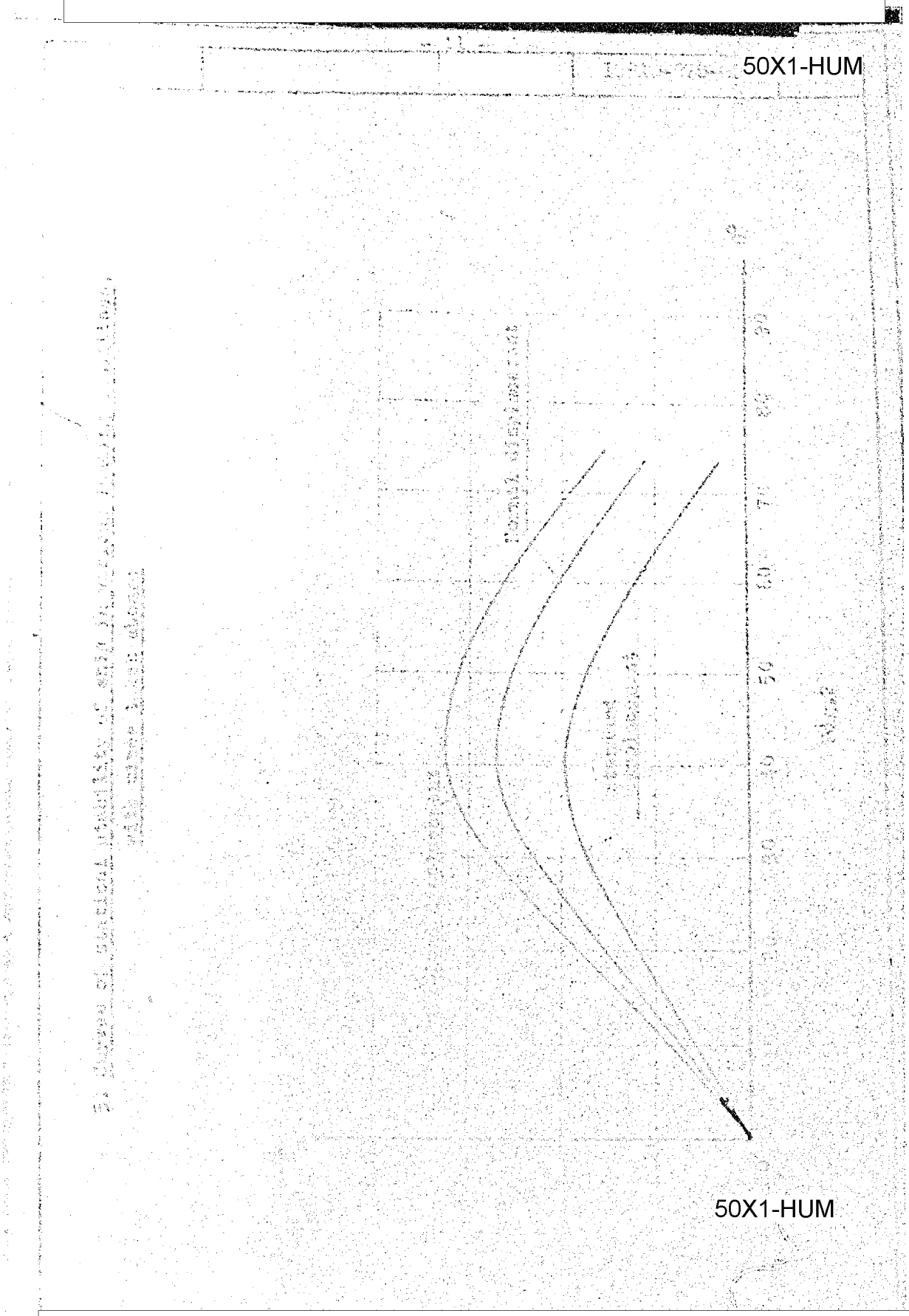

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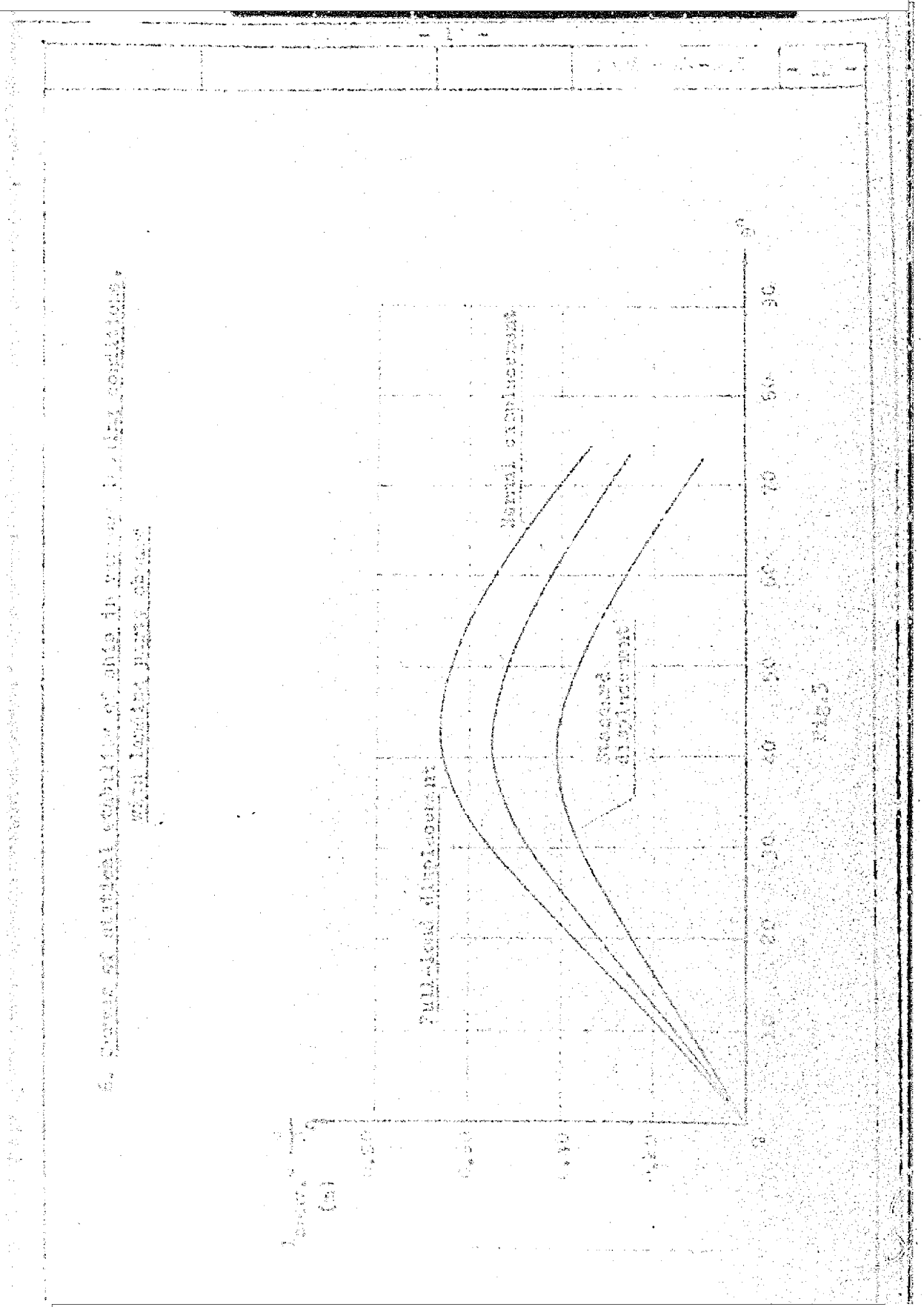

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Table 5

| Row | Size, in. | Number required to make up bank, | Gain in inches per section of |
|---|---|---|---|
| | | | |
| | | 40 | 5 |
| | | 24 | 3 |
| | | 16 | 2 |
| | | 32 | 6 |
| | | 20 | 4 |
| | | 10 | 2 |
| | | 24 | 1 |
| | | 12 | 1 |
| | | 16 | 3 |
| | | 8 | 2 |

Table 6

| | Transient displacement | | Normal displacement | |
|---|---|---|---|---|
| | m/sec. | Time, secs. | m/sec. | Time, secs. |
| | | | 47 | 10 |

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10. Unsymmetrical immersion or capsize point of survival

The ship will remain afloat with any two adjacent watertight compartments flooded.

The ship may be able to survive even in the event of the ship's probability factor being exceeded, with three, and sometimes more than three, adjacent compartments flooded.

Regarded flooding of the aft extremity of the ship and unsymmetrical flooding of three and more compartments amidships should be regarded as dangerous, for it leads to great losses in transverse stability.

Also great losses in longitudinal stability can be incurred due to dangerously flooding the fore extremity of the ship up to the bulkhead at fr.96 and aft extremity up to the bulkhead at fr.94, and simultaneous flooding of four compartments.

Unsymmetrical flooding can produce large angles of heel.

To eliminate probable unsymmetrical flooding, provision is made for a levelling pipe fitted between the tanks No.6 and No.7, and levelling sluice valves between tanks No.2 and 3, 11 and 10.

Flooding away of the ship's forward extremity to fr.121 does not endanger the transverse and longitudinal stability of the part remaining afloat.

Flooding away of the ship's after extremity to fr.15 is dangerous for the case transverse stability, due to the loss of transverse stability.

The presence of leaks, which [illegible] to the flooded ones in the ships [illegible]

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## III. RECOMMENDATIONS ON MAINTAINING SERVICEABILITY AND SAFETY OF SHIP

### 1. Recommendations on keeping record of ship's stability

(a) Systematically register the ship's displacement. The displacement of the ship is generally estimated by the data on the weights taken aboard, discharged or used up.

[illegible] (at least once a month), verify the ship's displacement by the amount measured data (draught marks) by [illegible] curve.

(b) [illegible] the transverse metacentric height of the ship.

When the ship is in port for loading reduction and the reconstruction or repair is just now closely observed, the transverse metacentric height is determined by the [illegible] on the floating vessel.

If additional weights of considerable amount continue on board, also if it is not one time, the metacentric height should be estimated by the natural period of ship's rolling.

The transverse metacentric height (h) is determined by the formula:

$$h = \frac{B}{T^2} \quad \text{where}$$

h = metacentric height,

T = natural period of [illegible] (in seconds) obtained when the ship is caused to roll by the crew running from side to side.

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(c) Keep record of the amounts and location of liquid cargoes on board. The amount of liquid cargoes should be daily estimated by actual measurements at standstill and every four hours when under way.

2. Recommendations on Maintaining stability in normal conditions

(a) Avoid overloading of the ship.

(b) When the amount of ammunition taken on board is less than the specified capacity of the ammunition room, it should be stowed in the lower racks of the magazine; start to use up the ammunition from the upper racks.

(c) Consumable weights should be arranged and secured in places specified by the design; avoid shifting weights afterwards.

(d) Avoid longitudinal arrangement of weights relative to C.L.

(e) Secure all weights reliably for sea.

(f) Do not allow water to accumulate in bilges, on platforms, in living and service spaces.

(g) Rigidly observe the rules for handling the levelling valves; do not allow liquid cargoes to flow freely from side to side.

Using up fuel from tanks No.2 and 3, 11 and 12, open the levelling valves fitted between these fuel tanks.

(h) Use up liquid cargoes from tanks on both sides alternately and by small portions.

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(2) Admit and consume fuel in compliance with the recommendations stated in the album of documents for training and reference.

3. Recommendations on maintaining stability in special conditions of loading

The landing party may only be taken on board when the ship is in normal and full-load condition.

The landing party should be homogeneously arranged on both sides avoiding crowding of people on one side.

With a landing party on board, ballast fuel tank No.1 with water till it is pressed right up provided the ship's displacement approximates the standard one.

Avoid positioning of the ship abeam to waves and winds when discharging the landing party and munitions.

4. Recommendations on maintaining stability in severe weather conditions

In stormy weather, i.e. at one state exceeding No.7 and in winds up to force 10, the following procedure should be observed:

(a) the commanding officer should execute manoeuvres to drive the ship into the weather (i.e. alter course as necessary to wind-wave direction);

(b) with the ship approximating her standard displacement, admit liquid ballast into fuel tank No.1 till it is pressed up, (by no more than [illegible] tanks numbered 4 and 5, 3 and 6, 2 and 7 of the ship may be applied.

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In ballasting the ship with liquid ballast check to see that the tanks are pressed up, i.e. free surfaces are reduced to minimum.

Tank No.1 is filled by gravity through the kingston valves and tanks numbered 2 to 5 are filled from the fire mains with the help of fire hoses.

5. Measures ensuring safety of ship

(a) Proper organisation and preparedness of the personnel for damage control.

(b) Systematic checking on, and adequate maintenance of the watertight bulkheads and watertight closures (doors, scuttles, hatches, and manholes).

(c) Strict observance of rules for closing down watertight closures is compulsory.

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(d) Proper maintenance of damage control equipment in a condition fit for immediate use.

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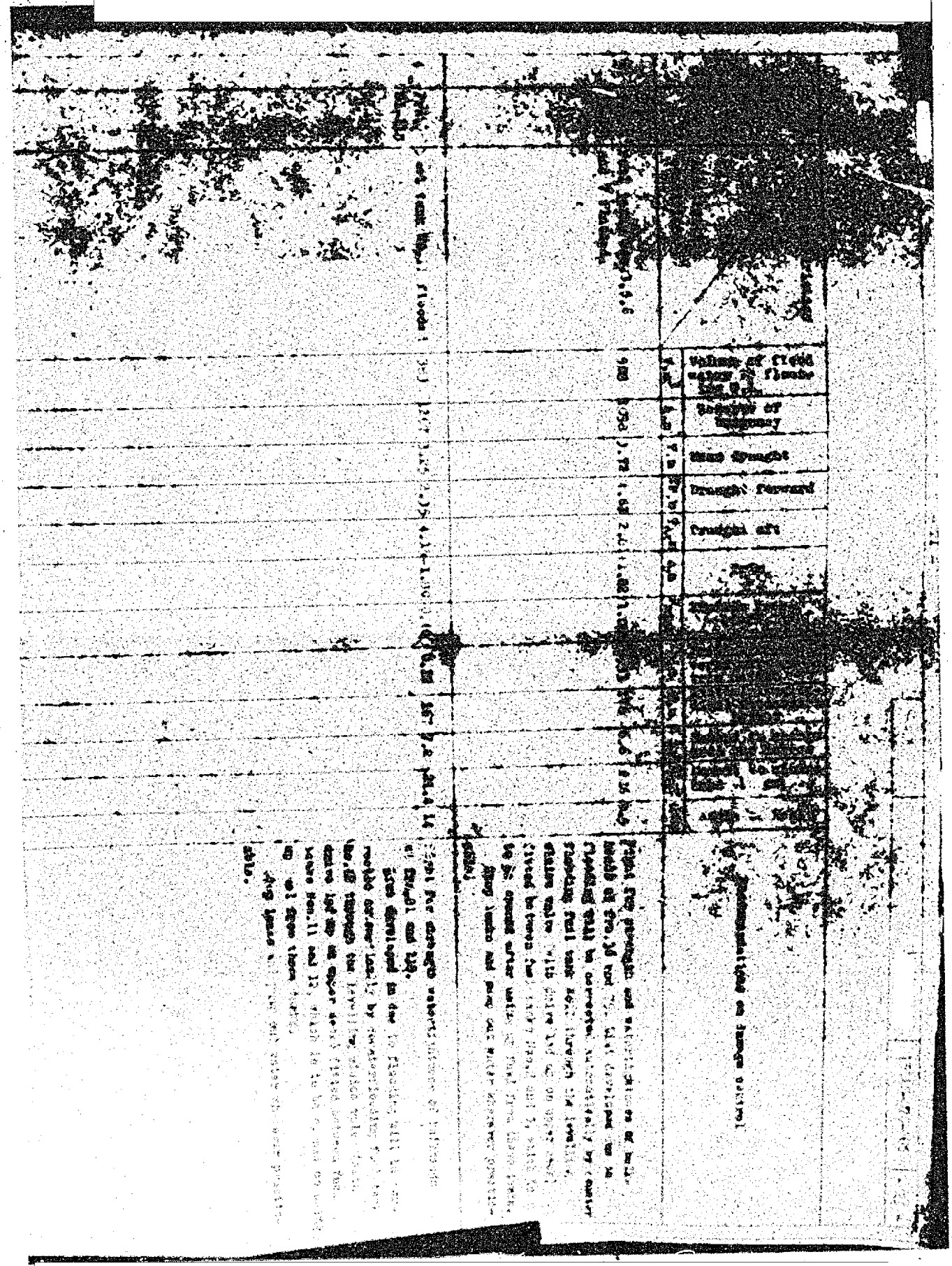

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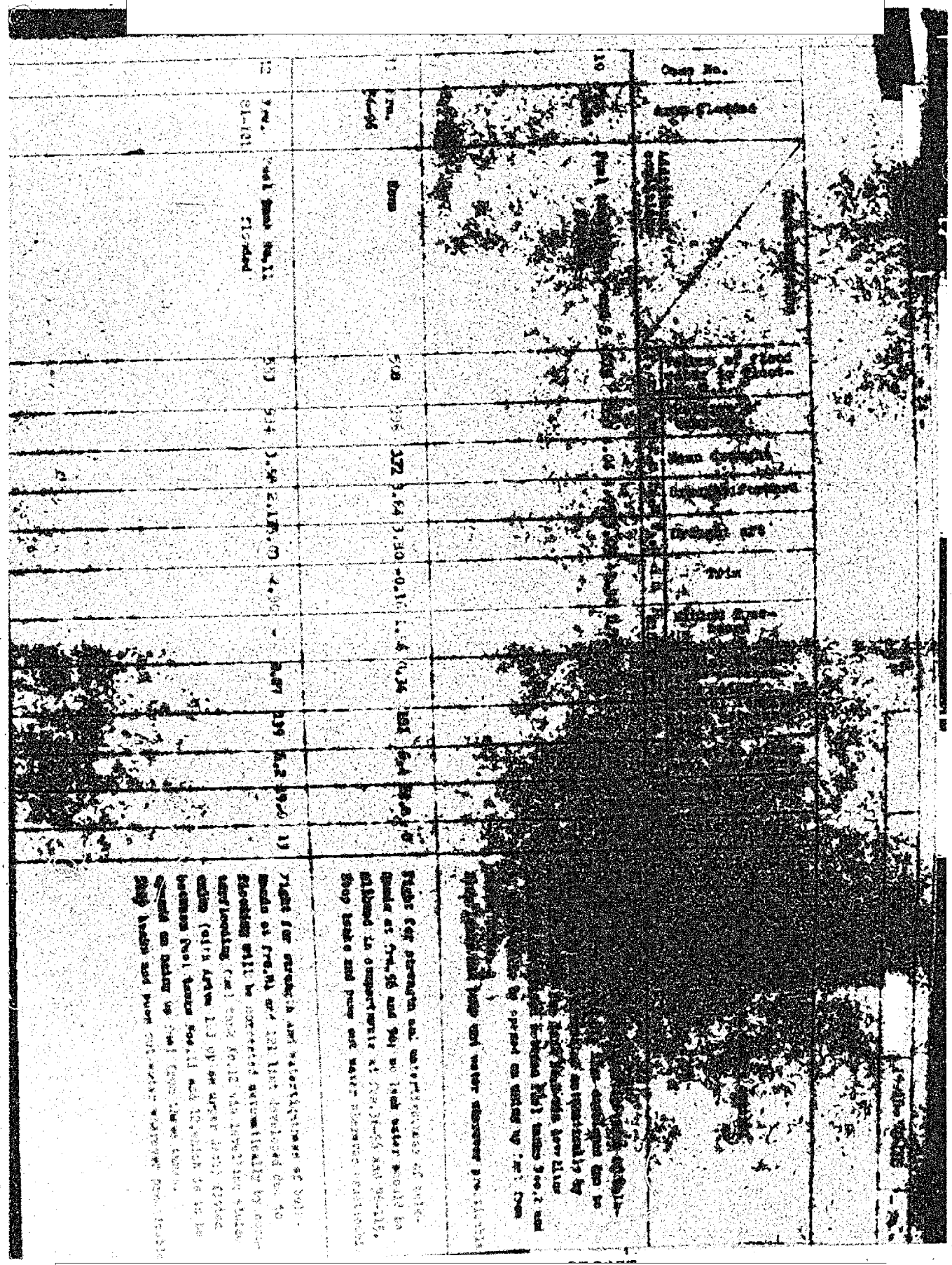

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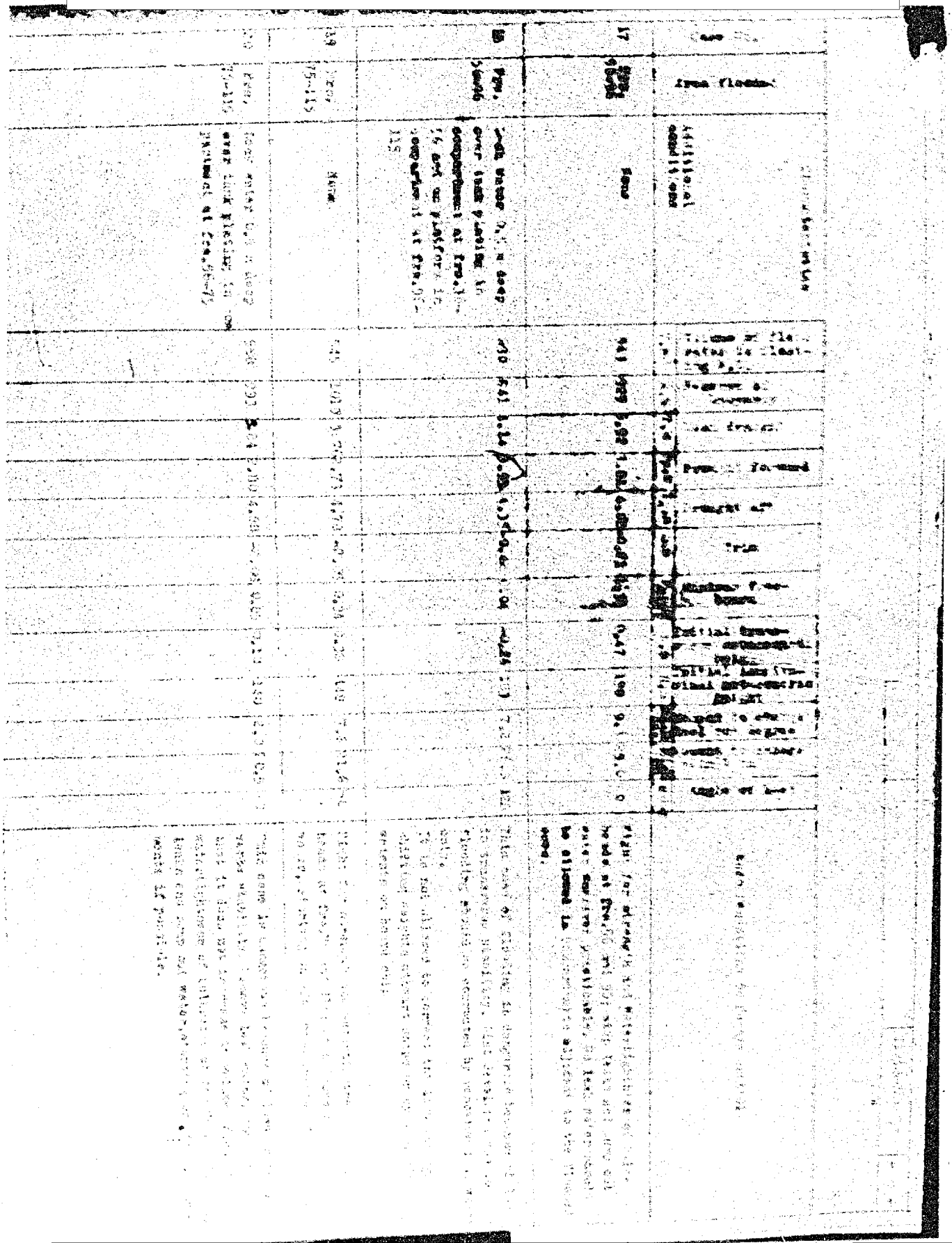

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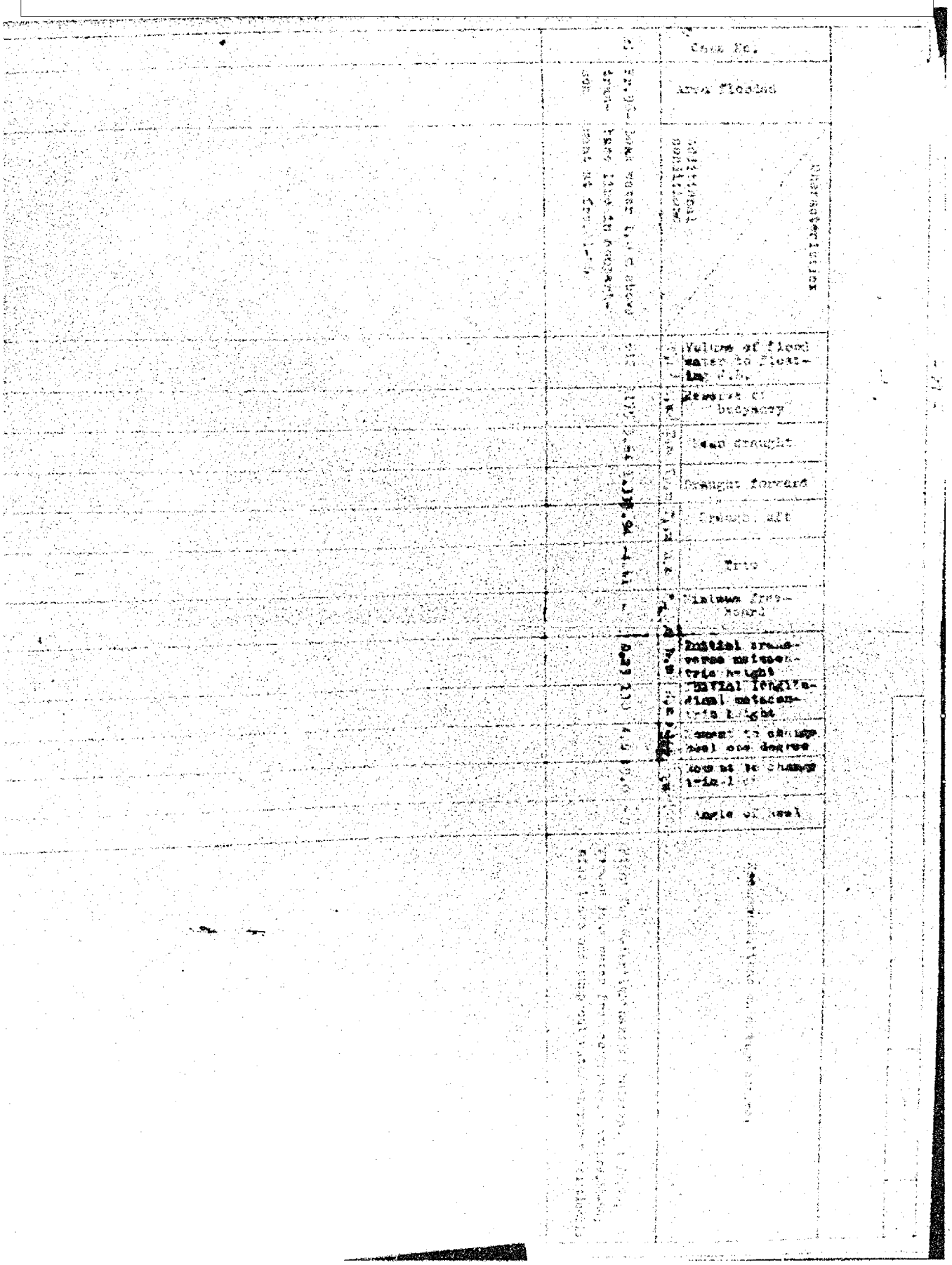


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